

Conference Abstract

The Creation of a Climatic Map of the Flora of the Netherlands

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Abstract

In this study, a high-resolution map showing the response of wild plants to climate patterns was created by combining open data from various sources.

The first step was to estimate the average temperature in the European distribution of each plant species occurring in the Netherlands. We used GBIF observations (GBIF.org 2017, 70.3M records) and the Worldclim2 BIO1 climatic model (Fick and Hijmans 2017) as datasources. Data cleaning included taxonomy (mapping names to local nomenclature and identifiers), removing taxa with less than 250 observations, and spatial aggregation to match a 50 km UTM grid. As GBIF data was found to be spatially biased, we overlayed both datasets using a bootstrapping approach (Sparrius et al. 2018a, Sparrius et al. 2018b). This resulted in a temperature indicator for thousands of plant species called the Species Temperature Index (STI).

The second step is to create a map that combines spatial distribution of flora with the temperature indices. The distribution of all vascular plants in the Netherlands was extracted as a 1x1 km grid from the National Database Flora en Fauna (NDFF 2017, 22M observations). The mean community STI, or Community Temperature Index (CTI), was then calculated for all species occurring in each grid cell. The result is a map showing the temperature as indicated by the flora.

On the map several patterns are visible which can be statistically explained by the the average temperature in the country, urban heat islands, and influx of southern species along rivers (Fig. 1).

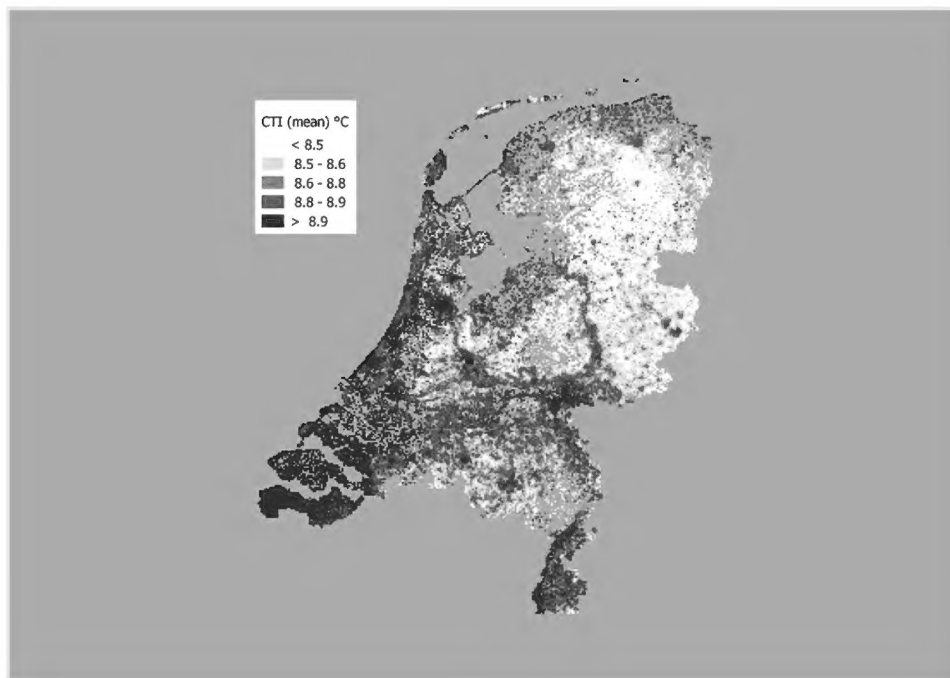


Figure 1.

Map of the Netherlands with the Community Temperature Index (CTI) of plants expressed as the mean Species Temperature Index (STI) for all plants found in km squares. Grid squares with less than 150 species were omitted and visualized in the grey background color of the map.

Presenting author

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